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## **CLAIMS**

1	1. An apparatus for identifying and quantifying components in an effluent			
2	stream from an ammoxidation reactor, comprising:			
3	a microprocessor; and			
4	a Fourier Transform infrared spectrometer having a sample cell through			
5	which may flow a portion of said effluent stream, an infrared source to emit infrared			
6	radiation and pass said infrared radiation through said effluent stream, an infrare			
7	detector to detect transmitted infrared radiation at selected infrared wavelengths			
8	and to generate absorbance data due to absorbance of said infrared radiation by			
9	said components, wherein each of said components absorbs infrared radiation at			
10	one or more of said infrared wavelengths, and an output apparatus to provide said			
11	absorbance data to said microprocessor;			
12	wherein said microprocessor is programmed to identify and quantify each of			
13	said plurality of components based upon said absorbance data and calibration			
14	data, said calibration data being obtained from recovery run analyses and			
15	calibration analyses in said sample cell.			
1	2. An apparatus as in claim 1, further comprising a memory device			
2	available to the microprocessor for storing said calibration data for each of the			
3	plurality of components.			
1	<ol> <li>An apparatus as in claim 1, further comprising an output device for</li> </ol>			
2	outputting quantitative data for each of said plurality of components.			

4. An apparatus as in claim 3, further comprising a reactor controller communicating with said ammoxidation reactor and said output device and adapted to adjust and control operation of said ammoxidation reactor based on said quantitative data.

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2	one or more of reactor temperature, reactor internal pressure, feed of air, feed of
3	hydrocarbon and feed of ammonia.
1	6. An apparatus as in claim 5, wherein said reactor controller is
2	controlled by said microprocessor.
1	7. An apparatus as in claim 1, further comprising a display for displaying
2	data input to and output from said microprocessor.
1	8. An apparatus as in claim 2, wherein said calibration data provided to
2	said memory device has been obtained from effluents from said ammoxidation
3	reactor
1	9. An apparatus as in claim 1, wherein said ammoxidation reactor is
2 -	operated to produce acrylonitrile.
1	10. A method for identifying and quantifying components in an effluent
2	stream from an ammoxidation reactor, comprising:
3	(A) advancing a portion of said effluent stream through a sample cell in
4	a Fourier Transform infrared spectrometer;
5	(B) scanning said portion in said sample cell with infrared energy at a
6	plurality of infrared wavelengths, wherein each of said components absorbs said
7	infrared energy at one or more of said plurality of selected wavelengths;
8	(C) detecting said infrared radiation passing through said sample cell and
9	generating absorbance data for each of said components; and
10	(D) quantifying each of said components by comparing said absorbance
11	data to a calibration curve for each component in a microprocessor programmed
12	to quantify each of said components.

An apparatus as in claim 4, wherein said reactor controller controls

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2	results for ea	ach of said plurality of components.	
1	12.	A method as in claim 11, wherein said quantitative data is output to	
2	a reactor con	troller communicating with said ammoxidation reactor and said reactor	
3	controller is adapted to adjust and control operation of said ammoxidation reacto		
4	based on sa	id quantitative data.	
1	13.	A method as in claim 12, wherein said reactor controller is controlled	
2	by said micro	oprocessor.	
1	14.	A method as in claim 12, wherein said reactor controller controls one	
2	or more of reactor temperature, reactor internal pressure, feed of air, feed of		
3	hydrocarbor	and feed of ammonia.	
1 .	15.	A method as in claim 10, further comprising displaying data input to	
2	and output f	rom said microprocessor.	
1 ·	16.	A method as in claim 10, wherein said calibration curve is calculated	
2	from calibration data obtained by performing on effluents from said ammoxidation		
3	reactor recovery run analyses and calibration analyses in said sample cell, said		
4	calibration analyses performed using steps (A), (B) and (C)		
1	17.	A method as in claim 10, wherein said ammoxidation reactor is	
2	operated to	produce acrylonitrile.	
1	18.	A method for controlling operation of an ammoxidation reactor based	
2	upon real-tir	me quantitative analysis of components in an effluent stream from said	
3 .	ammoxidati	on reactor, comprising:	

A method as in claim 10, further comprising outputting quantitative

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results for each of said plurality of components.

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4	(a) preparing a calibration curve for each of said components by		
5	analyzing a plurality of effluent streams each containing said components by a		
6	calibration process comprising;		
7	(a-1) advancing at least a portion of each said effluent stream		
8	through a sample cell in a Fourier Transform infrared spectrometer;		
9	(a-2) scanning each said effluent stream advancing through said		
10	sample cell with infrared energy across a range of infrared wavelengths and		
11	obtaining absorbance data at selected wavelengths across said range of		
12	infrared wavelengths;		
13	(a-3) collecting at least one sample corresponding to each said		
14	effluent stream;		
15	(a-4) performing a recovery run analysis on said at least one sample		
16	to obtain quantitative data for each of said components in said at least one		
17	sample; and		
18	(a-5) determining said calibration curve for each of said components		
19	by correlating said absorbance data and said quantitative data;		
20	(b) obtaining real-time absorbance data for each of said components in		
21	an operational effluent from said ammoxidation reactor by performing steps (a-1)		
22	and (a-2) thereon and calculating in a microprocessor programmed therefor real-		
23	time quantitative data for said operational effluent from said calibration curve and		
24	said real-time absorbance data; and		
25	(c) controlling by a reactor controller said ammoxidation reactor to		
26	optimize production of at least one of said components based on said real-time		
27	quantitative data.		
1	19. A method as in claim 18, wherein said calibration is performed in a		
2	microprocessor programmed to prepare said calibration curve.		

A method as in claim 18, further comprising outputting quantitative

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21. A method as in claim 18, wherein said quantitative data is output to
a reactor controller communicating with said ammoxidation reactor and said reactor
controller is adapted to adjust and control operation of said ammoxidation reactor
based on said quantitative data.

- 22. A method as in claim 21, wherein said ammoxidation reactor controller is controlled by said microprocessor.
- 23. A method as in claim 18, wherein said ammoxidation reactor is operated to produce acrylonitrile.